SCADAMETRICS
APPLICATION NOTE

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Version 004
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Configuring EtherMeter™–MicroLogix (1100/1400) Communications Using EtherNet/IP™.

(Note: This document also applies to EtherMeter-SLC/505 Communications.)

The purpose of this document is to provide assistance to the Allen Bradley MicroLogix PLC (1100 or 1400) user who wishes to connect to an EtherMeter using the EtherNet/IP™ protocol. This document assumes that the user is well-versed in MicroLogix PLC's and the RsLogix Programming Environment.

When creating an EtherNet/IP™ client/server connection between an Allen Bradley MicroLogix 1100 or 1400 PLC (client) and an EtherMeter™ (server), no special setup is generally required within the EtherMeter's Setup Menu. The EtherMeter features an "always-on" EtherNet/IP™ server on TCP logical port 44818; and it is configured to auto-detect and service incoming client requests from MicroLogix 1100 and 1400 PLC's. To simplify integration into an EtherNet/IP network, the EtherMeter emulates a SLC/500 series PLC.

1. Wiring Configuration.

   In this example, the Ethernet ports of the MicroLogix and EtherMeter are wired directly to each other, without an Ethernet switch, using a single Ethernet crossover cable. Alternatively, the Ethernet ports of both the MicroLogix and EtherMeter could be connected to a common Ethernet switch if expanded network connectivity is desired. For reference, the wiring and hardware configuration is illustrated in Figure 1.

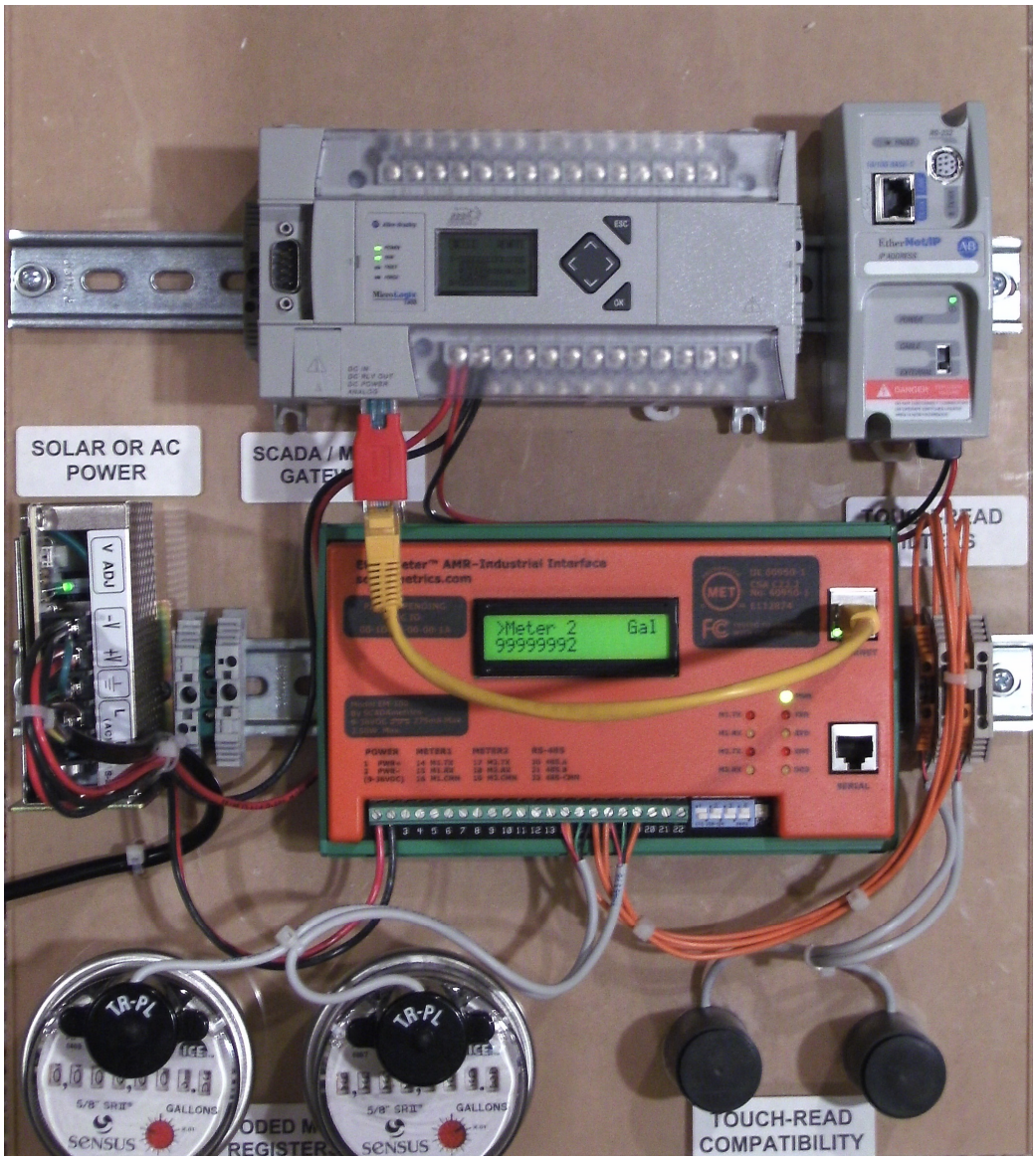

Figure 1. EtherNet/IP™ Communication Demonstration Panel.
MicroLogix 1400 / EtherMeter Hardware and Wiring Configuration.

* EtherNet/IP™ is a trademark of ControlNet International.

2. MicroLogix Ethernet Port (Port 1) Configuration.

Within a MicroLogix PLC, communication setup is performed within the RsLogix Programming Environment. Figure 2 displays a screen snapshot of a simple ladder logic program that is designed to poll the two (2) totalization and two (2) flow-rate registers of an EtherMeter, deposit the data into the N7:xx integer (16-bit) registers, and then copy the data into the L12:xx long integer (32-bit) registers:

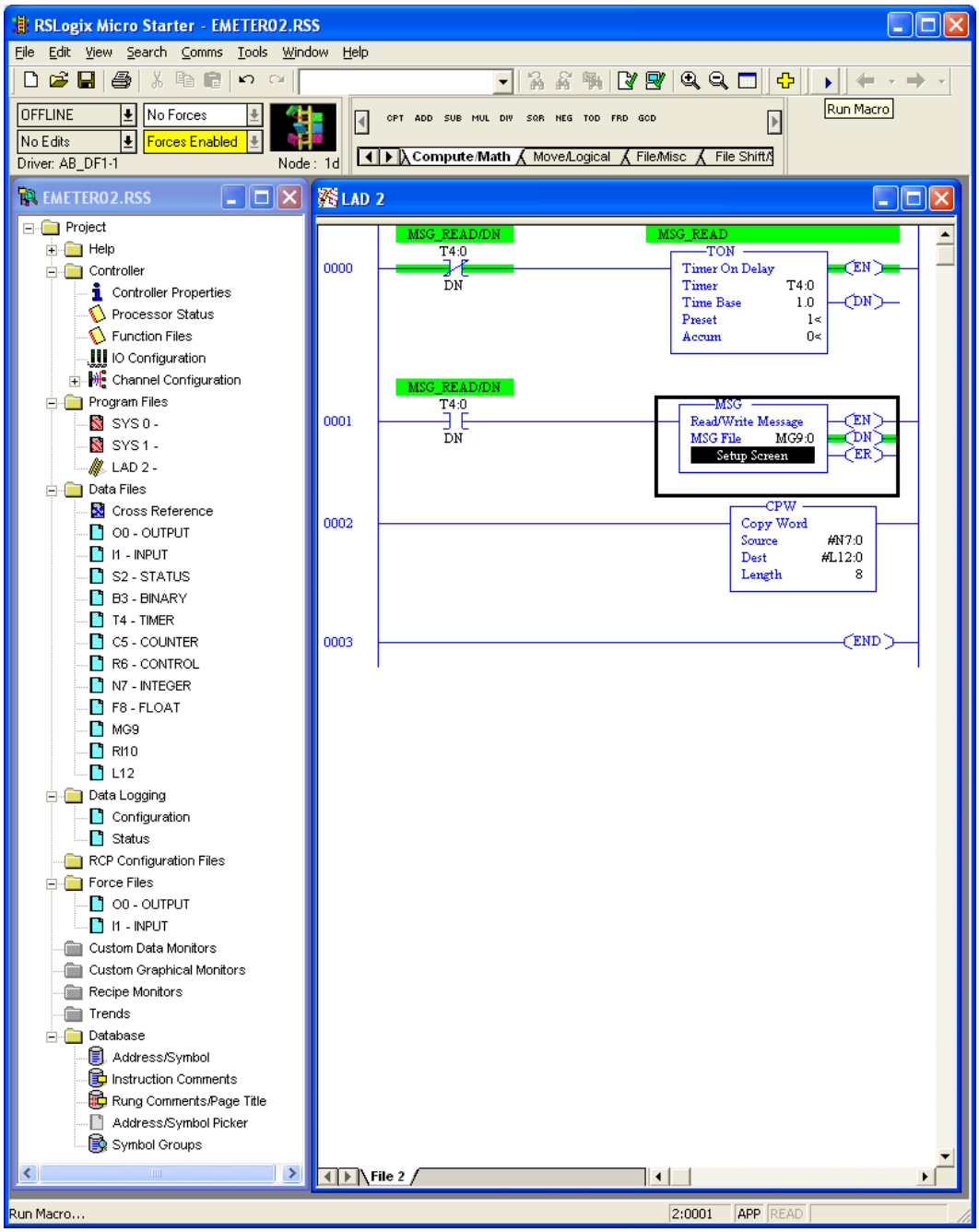

Figure 2. RsLogix Programming Environment.

To begin the setup, a new programming project should be initialized In RsLogix using the appropriate selections for processor type, version, serial port setup, etc.. For brevity, the details of these steps have been omitted.

In order to configure the MicroLogix's Ethernet port, double-left-click the "Channel Configuration" icon in the Project (leftmost) Frame. The "Channel Configuration" window will appear. Select the "Channel 1" tab, and enter the setup parameters as shown in Figure 3.

It is important to note that the default static IP Address of the EtherMeter is 192.168.1.140. Therefore, in this example, 192.168.1.191 is entered as the static IP Address of the MicroLogix, although any non-conflicting IP Address on the same 192.168.1.xxx subnet could be used.

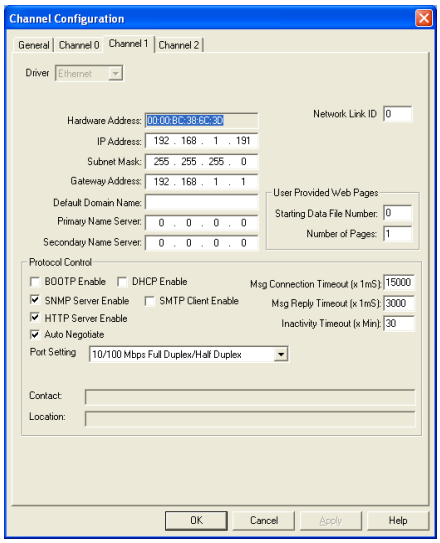

Figure 3. Channel 1 (Ethernet) Configuration Window.

3. Ladder Logic.

In Rung 0, a self-resetting, one-second timer is created to set up the polling interval, although a shorter or longer polling interval could be selected, depending upon the application.

In Rung 1, the one-second timer is used to trigger the message instruction to the EtherMeter. A double-left-click on the "Setup Screen" button of the MSG Block causes a popup window to appear, as shown in Figure 4. The setup parameters should be entered as shown in the figure.

Within the popup window, first the "General" tab should be selected, and the parameters on its page should be entered as instructed below. The General tab is shown in Figure 4.

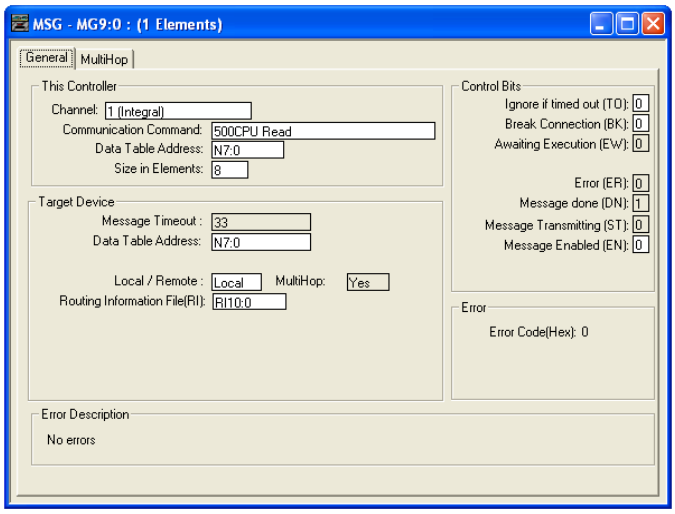

Figure 4. Message Configuration Window (General Tab).

Under the "This Controller" heading, note that the selected Channel is "Channel 1 (Integral)", which corresponds to the MicroLogix's Ethernet port. The selected "Communication Command" is "500CPU Read", as the EtherMeter emulates a SLC/500. The selected target data table address within the MicroLogix is N7:0, although a different memory location could be chosen. The "Size in Elements" is entered as "8" (8 x 16-bit words), because in this example four 32-bit words are requested from the EtherMeter (Total1, Total2, Flow1, Flow2).

Under the "Target Device" heading, note that the "Data Table Address" is entered as N7:0, as this is the desired beginning memory location within the EtherMeter. For the complete memory map of the EtherMeter, please refer to the User Manual or Setup Menu. For "Local/Remote", "Local" should be selected. For "Routing File", RI10:0 is entered, although an alternate Routing Information File could be chosen. No manual editing of the Routing Information File is required.

Next, the "MultiHop" tab should be selected, and the "To Address" should be entered as "192.168.1.140", which is the IP Address of the EtherMeter in this example. The MultiHop tab is shown in Figure 5.

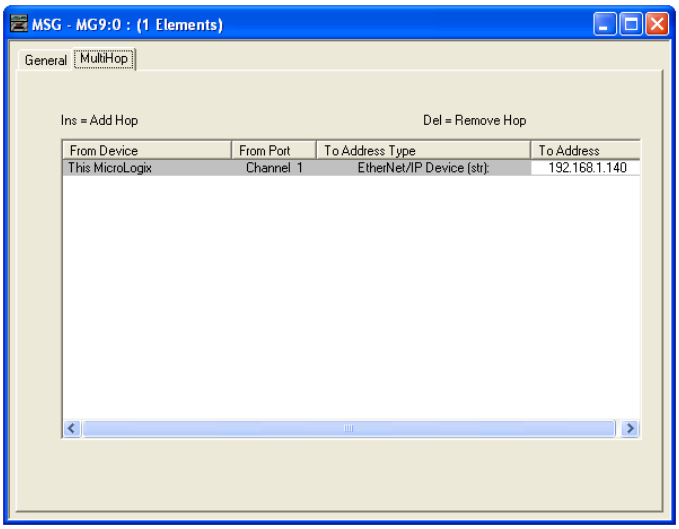

Figure 5. Message Configuration Window (MultiHop Tab).

In Rung 2, the eight 16-bit words contained in the N7 registers are copied into the L12 registers, which are used for holding long (32-bit) integers.

4. Results.

After the Ethernet port is configured and the ladder logic is written, the program should be downloaded into the MicroLogix; and the PLC should be placed into "Run Mode".

In this example, the EtherMeter is reading two encoded meter registers. As documented in the EtherMeter User Manual, the totalization register contents are never scaled by the EXPn multiplier, so as to eliminate the possibility of 32-bit overflow conditions. The following meter data is applicable to this example:

Meter 1 Total:	1.9 GAL	(Register Contents: 19)
Meter 2 Total:	9999999.2 GAL	(Register Contents: 99999992)
Meter 1 Flow Rate:	0 GPM	(Register Contents: 0)
Meter 2 Flow Rate:	0 GPM	(Register Contents: 0)

Figure 6 displays screen snapshots of the N7 and L12 register contents. Note that the large value for Meter 2 (99999992) spans two 16-bit registers (N7:2-3), so this value is only rendered correctly in the context of a single, 32-bit register in L12:1.

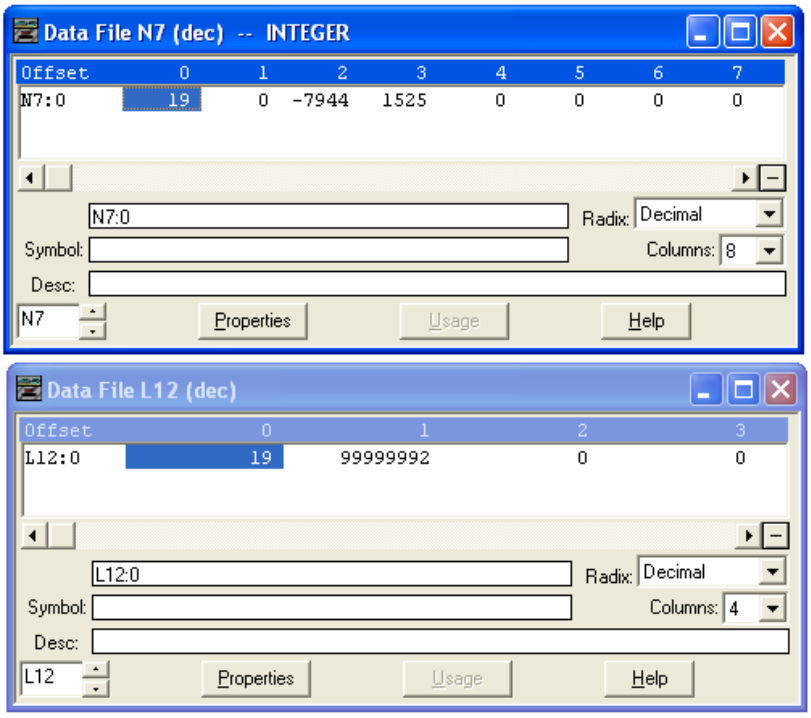

Figure 6. Register Display Windows (Realtime).

5. Notes.

   When setting up EtherNet/IP communications between the MicroLogix PLC and EtherMeter, it is important that only one message instruction to the EtherMeter be programmed per ladder rung. Use of more than one message instruction per ladder rung to the EtherMeter may result in inconsistent communications.